confirmation of the accuracy of Professor Schultze's view; and we must henceforth regard all siliceous spicules exhibiting tubular cavities as distinct in their origin from the organisms within whose chambers they occur, unless every portion of the wall or framework of such chambers is similarly constituted.

Kensington, December 18, 1863.

XII.—*On undescribed British Hydrozoa, Actinozoa, and Polyzoa.*

By the Rev. Alfred Merle Norman, M.A.

[Plates IX., X., XI.]

Although the animals formerly associated in the class Zoophyta have long since been physiologically parted asunder, it is often practically convenient to unite them, or rather, perhaps I should say, to arrange them side by side, in our collecting, our cabinets, and our papers. I trust therefore that this practical convenience may be deemed a sufficient excuse for here bringing together descriptions of animals belonging to totally different classes.

I must return my sincere thanks for the assistance that I have received from my ever-kind friend, Mr. Alder. Any value that this short paper may have will be due to his accurate drawings which illustrate the species.

Class HYDROZOA.

Fam. Corynidæ.

Genus Tubiclava (Allman).

Tubiclava Cornucopiæ, n. sp. Pl. IX. figs. 4 & 5.

T. reticulo tubulorum conchis viventibus adherentium basali; hydrothecis ab hoc reticulo assurgentibus cornucopiis forma similibus, supra quam infra paulo latioribus, suberectis, vix curvatis, subdiaphanis, incrementi lineis plus vel minus circumcinctis; polypis elongato-claviformibus, tentaculis filiformibus, discretis, et in capite et in stipite sparsis; gonophoris mori fructus formam referentibus, gonoblastidiis brevissimis, tubulis repentibus adjunctis, affixis. Pollicis quadrantem vix attingit. Mare Zetlandicum habitat.

A number of little trumpet-shaped tubes arise from a creeping base, which is attached to the shells of living Mollusca. These slightly curved tubular hydrothecæ are a fifth of an inch or a little more in height, narrowest at the bottom, and from thence of gradually increased diameter towards their distal extremity. Here and there encircling slightly elevated lines on the hydrotheca mark the successive stages of the animal's growth. The polypites are furnished with greatly elongated club-shaped heads, over the whole of which, as well as upon the upper portion of

the body, filiform tentacula are scattered. The gonophores are in the form of mulberry-like masses, at first sight apparently sessile, but really upon very short gonoblastidia, which are situated in openings in the creeping base of the hydrozoon.

Tubiclava Cornucopiæ was dredged in from 80 to 100 fathoms, about twenty miles north of Unst in Shetland, and was parasitic on the shells of *Astarte sulcata* and *Dentalium Entalis*. It is worthy of remark, that in every instance the hydrozoon was observed upon shells still occupied by the living Mollusca, and that it invariably had assumed a position at the posterior extremity of the shell, where it would receive the benefit of the aqueous currents caused by the mollusk, which, while providing for its own necessities, thus unwittingly performed the kindly office of feeding its hungry neighbour.

The genus in which this undescribed form is placed was established by Professor Allman in the 'Report of the British Association' for 1862.

Fam. **Tubulariadæ.**

Genus Eudendrium (Ehrenberg).

Eudendrium annulatum, n. sp. Pl. IX. figs. 1–3.

E. fruticosum; ramis majoribus crassis, coalescentium fistularum insolito reticulo obductis; ramulis numerosissimis, brevibus, passim distincte (sicut in *Coryne ramosa*) annulatis; polypis calices non expansos obsidentibus, tentaculis 16–20 præditis; gonophoris uvarum formam simulantibus, in gonoblastidiis positis.

Hydrozoon quatuor pollices attingit. In freti "Burrafirth" cavernis apud insulas Zetlandicas vitam degit.

This *Eudendrium* grows to a height of about 4 inches, and is seen at a glance to differ from its congeners *E. rameum* and *E. ramosum* in its more shrubby and dense habit. The main stems are very thick and strengthened with a curious network of anastomosing tubes on their surface (Pl. IX. fig. 3). The smaller branches are closely and regularly ringed in every part (fig. 2), and are excessively numerous. The tubes are not expanded at their extremities to receive the polypites, as is the case in some allied species. The polypites are furnished with from sixteen to twenty tentacles. The gonophores are grouped in clusters, consisting of eight to twenty egg-shaped bodies attached round the axis of gonoblastidia, which are of moderate length.

Eudendrium is a difficult genus; but the present species appears to be very distinct from the seven British forms which have hitherto been described. It was found in a cave, known as "Buness Hall," which is one of many caverns, all remarkably rich in animal life, which penetrate the cliffs on the eastern side of Burrafirth, the northernmost of the voes of Shetland. It was

attached to the perpendicular sides of this cavern, about a foot beneath the water at the lowest spring-tide. Other, but much smaller specimens were inhabiting a rock-pool just outside the cave. These last examples, though not more than an inch or an inch and a half high, were loaded with reproductive bodies, which, however, were wholly absent from their larger brethren in the cave.

Class ACTINOZOA.

Fam. **Alcyonidæ.**

Genus Rhizoxenia (Ehrenberg).

Rhizoxenia albicolor, n. sp. Pl. X. fig. 1.

R. albescens ; basi communi sive interstitiis cellularum polypiferarum convexarum latitudinis fere dimidium haud attingentibus, longitudine plerumque vix æquantibus rarissimeque superantibus cellularum diametrum.

Mare prope insulam Jersey habitat.

This species is at once distinguished from *R. catenata* (Forbes) by its colour, which is white. The polyps are placed very closely together ; their diameter is half as great again as that of the connecting creeping base, and the distance from polyp to polyp is generally less than the diameter of the polyp itself.

In these respects the present form differs widely from a white species which has previously been described by Sars under the name of *Rhizoxenia filiformis* (Sars, Faun. Litt. Norveg., sec. livr. p. 65, pl. 10. figs. 13–17).

R. albicolor was found creeping over a stone dredged off Gorey, in Jersey, in 1859.

The genus *Rhizoxenia* was established by Ehrenberg, in his 'Corallenthiere des rothen Meeres,' Berlin, 1834, p. 55, and thus has precedence of Forbes's genus *Sarcodictyon.*

Class POLYZOA.

Fam. **Membraniporidæ.**

Genus Lepralia, Johnston.

Lepralia venusta, n. sp. Pl. X. figs. 2 & 3.

L. cellulis ovatis, convexis, umbone lævi magno conspicuo in medio infra orificium sito instructis ; superficie perforata ; orificio orbiculari inferne sinuato ; peristomate simplici, inermi ; ovicellula galeata, punctata, avicularium parvum in summo sustinente.

Cells ovate, somewhat elongated, convex, irregularly disposed, having a large and prominent smooth umbo placed a little below the mouth ; surface elsewhere perforated. Mouth nearly circular, but having a wide shallow sinus on the under lip. No spines on

the simple peristome. Ovicell in the form of a helmet, punctured in the same manner as the cells, and surmounted by a small avicularium.

Dredged on shell off Guernsey, in about 10 fathoms (1859).

This well-marked form is not likely to be confounded with any previously described *Lepralia* that we are acquainted with.

Lepralia complanata, n. sp. Pl. X. fig. 4.

L. cellulis rhomboideis, planis, immersis, perforatis, lineis elevatis inter se separatis; orificio semicirculari, margine inferiore recto evexo, superiore convexo inermi; ovicellula minima, depressa, lunata, lævi.

Cells lozenge-shaped, much flattened, having their surface punctured and separated from each other by elevated lines. Mouth semicircular, with the upper lip well arched and not furnished with any spines, and the lower lip nearly straight, but pouting. Ovicells depressed, in the form of a quarter-moon, and having their surface smooth.

This species was found among the valuable collection of British Zoophytes accumulated by my late friend Mr. Barlee, and bequeathed to me by him. It is lodged in the little hollows of a rounded and much water-worn piece of coarse-grained granite. This fact may probably hereafter lead to the identification of the exact locality of the specimen, which (there being unfortunately no label attached) is at present unknown to me. In company with it on the stone were *Membranipora spinifera*, *Lepralia spinifera* (true), and *Lepralia punctata*.

Lepralia laqueata, n. sp. Pl. X. fig. 5.

L. cellulis rhomboideis, latis, subimmersis, granulosis, puncturis marginalibus magnis lineisque elevatis sejunctis; orificio semicirculari, margine superiore dentibus tribus (?) plerumque evanescentibus armato, inferiore recto evexo denticulum penitus collocatum desuper spectato ostendente; ovicellula rotundata, convexiuscula, subimmersa, granulosa, ad marginem perforata.

Cells lozenge-shaped, nearly immersed, having their surface granular, and pierced with a single row of large punctures round the margin. The cells are separated from each other by raised lines. Mouth semicircular, apparently armed when perfect with three teeth on the upper margin, but in all the specimens I have seen only the stumps remained. The lower margin of the mouth is straight and considerably pouting. A denticle is situated within the lower lip, but is so deeply seated that it cannot be seen when the cell is viewed in front. The ovicells are round and nearly immersed, being only slightly convex.

Their surface is granular, and they are punctured round the margin in the same manner as the cells. Found on stones, from 80 to 100 fathoms, Shetland, 1861 and 1863.

This species approaches certain forms of *L. variolosa* very closely; and indeed it is difficult to point out the distinctions of the two species in words. I have seen, however, a large number of *L. laqueata*, and they all differ from *L. variolosa*,—1st, in having the cells much larger, more rhomboidal, and less elongated, wider in proportion to their length, and less regularly arranged in quincunx; 2ndly, in being invariably tinged with red in living and being ivory-white in dead specimens, and having their surface dull, instead of shining with the bright gloss which is so marked a feature in *L. variolosa*; 3rdly, in having the denticle much more deeply seated within the mouth, and in having the ovicells less immersed.

Lepralia divisa, n. sp. Pl. X. fig. 6.

L. cellulis convexiusculis, glabris, approximatis, in lineis dispositis; orificii margine superiore spinis sex longissimis armato, inferiore denticulato; ovicellula globosa, glabra, fissura angusta longitudinali parallela inferne occlusa discissa.

This is an exquisitely beautiful *Lepralia*, remarkable for its snow-white colour, the linear arrangement of its closely crowded cells, and the very great length of the six spines which surround the upper margin of the mouth. The cells themselves are small and smooth, but have little character, being quite subordinate to the mouth and ovicell, which are the parts of the polyzoary which at once strike the eye; indeed the cell is generally almost entirely hidden by the superincumbent ovicell of the cell placed immediately beneath it in its own linear series. The mouth has the lower lip furnished with two or three tooth-like points, and sometimes produced outwards into a large spatulate process or flattened umbo. The upper lip, when not surmounted by an ovicell, is furnished, as before stated, with six very long and slender spines. The ovicell is semielliptical, much elevated, but somewhat flattened on the face, which is marked with longitudinal lines, and cleft down the centre with a narrow, parallel-sided slit, which is closed below.

Dredged in 1859, between Guernsey and Herm, on dead shells.

Lepralia divisa is allied to *L. fissa* (Busk); but the latter species may at once be known from it by the presence of a conspicuous central sinus on the lower lip, and the absence of the teeth of *L. divisa*, and by the fissure in the ovicell being triangular, rapidly widening towards and quite open at the base, and not extending so far towards the summit of the ovicell as is the case

in the narrow slit of *L. divisa*. There are other differences, but of minor importance, between the two species.

Lepralia polita. Pl. XI. fig. 1.

L. cellulis ovatis, tumidis, suberectis, irregulariter dispositis, aliquantum sejunctis; superficie lævi, nitida; orificio semicirculari labio inferiore recto, superiore quatuor vel quinque spinis evanescentibus brevibus armato; peristomate plerumque ad latus utrumque in processum parvum elevato; ovicellula globosa, tumidissima, recumbente, polita.

The living polyzoary is pinkish. The cells are oval, very tumid, irregularly disposed, and a little elevated anteriorly. Their surface is nearly smooth, and highly polished. The semicircular mouth has the lower lip straight, and the upper armed with four or five short spines, which however are very rarely present. On each side of the mouth the peristome is raised into an elevated shoulder-like process, against the base of which the ovicell, when present, rests. The ovicell is globose, tumid, and glossy, and leans backward off the mouth.

In small patches on shells and stones, dredged in 70–100 fathoms off Shetland.

Lepralia microstoma, n. sp. Pl. XI. fig. 2.

L. cellulis lageniformibus, superne liberis, elevatis, sejunctis, in strato punctato dispositis; superficie subtiliter granulosa; orificio contracto, peristomate producto, labio inferiore evexo, superiore ad apicem centralem assurgente; ovicellula globosa, tumidissima, recumbente, subtiliter granulosa.

The polyzoary in *Lepralia microstoma* frequently shows a tendency to assume an irregular outline; and processes, three or four cells wide, branch out here and there. In shape the cells are flask-like, very tumid, and gradually contracted above into a narrow neck. They are arranged without any order, and rise from a punctured crust, which fills up any interstices between the cells; their upper portion is much raised and quite free, so that the cells have a semierect position. The surface of both cells and ovicells is minutely granular. The mouth is very small, situated as it were on the top of the produced cell, and opening upwards. The peristome is much raised on the lower margin, forming a pouting lip, and on the upper rising to a central point. The ovicells are globose and very tumid, and have a backward inclination.

Encrusting small stones dredged in 80–100 fathoms in the Shetland Sea, about 20 miles north of Unst.

The general form of the cells and the manner of growth of the polyzoary of this species remind us of *L. simplex*; but the two species differ widely in all their details.

Lepralia cruenta, n. sp.

Lepralia violacea, var. *cruenta*, Busk, Cat. Marine Polyzoa, p. 69, pl. 110. fig. 1.

L. cellulis vix definitis, subovalibus, salebrosis, granulatis, paucis at magnis puncturis perforatis; orificio subcirculari, simplici, marginibus rotundate inflatis, a cellularum apice remoto; colore cruento vel nigrescente.

This is certainly not an overgrown state of *L. violacea*. The many specimens which I have seen, some of which were dredged by myself and some by Mr. Barlee in deep water at Shetland, all agree in those characters which are well represented in plate 110. fig. 1 of 'The Catalogue of British Marine Polyzoa.' If Mr. Busk had been better acquainted with the form at the time he published his work, I feel satisfied that he would not have referred it to *L. violacea*. The cells of *L. cruenta* are larger and broader than those of *L. violacea*; there is usually a slight depression in the median line of the former, but it seems to me to bear no resemblance to the central pore of the latter. The species is remarkable on account of the massive thickness of the cell-walls, their very rugged surface, and the position of the mouth, which is at some distance from the anterior extremity of the cell. The cells are ill-defined, but nearly ovate; their surface is not only undulated and (to employ a word which best expresses the appearance) puffy, but also roughly granular, and perforated here and there with large cellules. The thick cell-walls close in the nearly circular mouth with a broad, rounded fillet. The ovicells of the species are unknown to me. Deep red is the usual colour of *L. cruenta*, but one of my examples is blackish; this, however, may be the colour of the polyzoary if dead before it is dredged.

L. cruenta is generally in small roundish patches on large stones brought up from 70–100 fathoms, and is more rarely found on shell.

Genus Membranipora (De Blainville).

Membranipora sacculata, n. sp. Pl. XI. fig. 3.

M. cellulis rhomboideis, membrana nitida, tenui, subtiliter granulosa obductis; orificio magno, cellularum dimidium fere occupante, ad latera paulum contracto, itaque tres sinus inconspicuos formante; peristomate inermi, crenato et cum margine cellularum elevato crenato continuo; ovicellulis semiellipticis, tumidis, supra lævibus, infra spatio triangulari subtiliter granuloso; avicularis rarissimis, inter cellulas sitis, mandibulis triangularibus acutis superne directis.

The cells of this species are regularly rhomboidal or lozenge-shaped, margined with a much-elevated crenated rim, and covered in on their lower half with a thin, glistening, minutely

granular membrane. The oral aperture occupies nearly or quite half the cells, and has a somewhat three-lobed outline, from the fact that midway up each side there is a slight constriction of the orifice. The peristome is totally devoid of spines, and is an elevated crenated rim which is continuous with, and indeed represents, the cell-margin. The avicularia are very sparingly developed. When present, they are situated between the cells, are acutely triangular, and have the much-produced mandible directed upwards. The ovicells are semielliptical, tumid, and smooth, but having on the front a triangular space which is minutely granular. The colour of the species seems to be invariably pale olivaceous green.

Membranipora sacculata is not uncommon in the deep waters of the Shetland Sea, ranging from seventy to one hundred fathoms or more, and encrusting both stones and shells.

It is allied both to *M. cornigera* and *M. Rosselii*. The membrane which closes the cells is thinner than in either of those species. In the form of its cells it approaches very closely to the former, but never shows a vestige of spines, still less of the curious branched processes, and has avicularia differing totally in character from the numerous elliptical blunt-mandibled organs of that species. It may be known from *M. Rosselii* by the form of its cells, which are regularly rhomboidal and broader in proportion to their length. In *M. Rosselii* the polyzoary has the appearance of being formed of a number of loops, caused by the peculiar elongated ovate form of the cells, which are wider above than below, and by the fact that the raised marginal rim is more strongly developed round the summit of the cells than at the sides, whereas in *M. sacculata* the rim is of equal thickness throughout. In typical specimens of the former, moreover, the orifice occupies a much smaller proportion of the whole cell than is the case in the latter species.

Fam. **Tubuliporidæ.**

Genus Diastopora (Lamouroux).

Diastopora Sarniensis, n. sp. Pl. XI. figs. 4–6.

D. strato niveo, punctato, opaco, nullis lineis radiatis diaphanis notato; cellulis longiusculis, suberectis, punctatis; cellulis quibusdam capsula (forsitan ovicellula) umbone conspicuo mediano perforato instructa, superne occlusis.

Diastopora Sarniensis consists of a milk-white, opake, punctured crust spreading upon shells, with a round or lobulated outline, and sometimes reaches three-quarters of an inch in diameter. The polyzoary is not marked with the alternate opake and transparent radiating lines of *D. obelia*, and its

cells are more raised above the crust and tubular than those of the latter species. Here and there among the open-mouthed cell-tubes, there occurs a tube which, instead of being open, is closed above with a little cap, from one side of the centre of which rises an umbonal-like process which is perforated at the apex (Pl. XI. fig. 6). Probably these organs are connected with the reproduction of *Diastopora*, and are homologous with ovicells.

Dredged off Guernsey and Jersey, in 1859.

Sedgefield, Dec. 21, 1863.

DESCRIPTION OF THE PLATES.

Plate IX.

Fig. 1. *Eudendrium annulatum* (Norman). The hydrozoon of the natural size.

Fig. 2. The extremity of a branch of the same species, magnified to show the structure of the branches, the polypites, and the gonoblastidia.

Fig. 3. A portion of one of the larger stems of the same species, showing the curious network of tubes with which they are strengthened.

Fig. 4. *Tubiclava Cornucopiæ* (Norman). The hydrozoon on a shell of *Astarte sulcata*: of the natural size.

Fig. 5. A portion of the same, magnified, and showing the structure of the several parts of the species.

Plate X.

Fig. 1. *Rhizoxenia albicolor* (Norman), enlarged.
Fig. 2. *Lepralia venusta* (Norman),
Fig. 3. A single cell of the same, viewed laterally.
Fig. 4. *Lepralia complanata* (Norman).
Fig. 5. *Lepralia laqueata* (Norman).
Fig. 6. *Lepralia divisa* (Norman).

Plate XI.

Fig. 1. *Lepralia polita* (Norman).
Fig. 2. *Lepralia microstoma* (Norman).
Fig. 3. *Membranipora sacculata* (Norman).
Fig. 4. *Diastopora Sarniensis* (Norman): natural size.
Fig. 5. A portion of the same species, magnified.
Fig. 6. A few cells and ovicells more highly magnified.

BIBLIOGRAPHICAL NOTICE.

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The preparation and publication of local Floras in England has recently undergone a change. Formerly it was thought sufficient to form a complete list of the plants observed in a county or other